



Solar Power System Installation Manual

Polycrystalline Solar module

ChinaLight Solar Co. ,Ltd.
No3, Xingguangsan Street, Opto-Mechatronics Industrial Park, Beijing, P.R.China
Postcode:101111
Tel:+86-10-8150 6588
Fax:+86-10-8150 6120



- Please read this manual carefully before installing the system and carry out the installation procedures correctly.
- This manual does not list all precautions needed for safe work. Be sure to follow OSHA guideline.
- This manual provides guidelines for installation, but it does not guarantee the quality of installation work. Please complete all work in a responsible and professional manner. Electrical work should be performed by a qualified electrician.

**THE MOUNTING SYSTEM HAS BEEN LOAD TESTED AND VERIFIED BY A
PROFESSIONAL ENGINEER. THIS INFORMATION CAN BE PROVIDED UPON REQUEST.**

**ChinaLight Solar Co. ,Ltd.
No3, Xingguangsan Street, Opto-Mechatronics Industrial Park, Beijing, P.R.China**



1. FOR SAFE INSTALLATION WORK.....	4
1.1 CAUTIONS REGARDING INSTALLATION OF SOLAR POWER SYSTEMS	5
1.2 MOUNTING SYSTEM.....	6
1.3 PV MODULES.....	7
2. POINTS TO CHECK WHEN SELECTING THE INSTALLATION LOCATION	10
2.1 CONDITION OF HOUSE WHERE SOLAR POWER SYSTEM IS TO BE INSTALLED	10
3. SPECIFICATIONS.....	11
3.1 SOLAR MODULE AND ARRAY SPECIFICATIONS MODULES: CLS-230P	11
4. PARTS	13
5. POINTS TO CHECK BEFORE INSTALLATION WORK	14
5.1 UNPACKING AND CHECKING PARTS.....	14
5.2 MATERIALS AND TOOLS YOU WILL NEED.....	14
6. INSTALLATION WORK.....	16
6.1 PREPARING SHINGLE ROOF FOR INSTALLATION	16
6.2 CHECKING LAYOUT.....	16
6.3 INSTALLING THE FLASHINGS (OPTIONAL)	16
6.4 Mechanical Installation	17
6.5 SYSTEM GROUNDING	22
6.6 INSTALLING MODULE SUPPORT RAILS	22
7. LIMITED WARRANTY	23



1 FOR SAFE INSTALLATION WORK

Warning

- Do not cut or modify Mounting System. Doing so is dangerous. Safety cannot be guaranteed.
- Stop work during stormy weather. Solar modules can be caught in the wind, causing you to fall.

Caution

- Never step or sit on the glass surface of a solar module. The glass may break, resulting in shock or bodily injury. The module may also stop generating power.
- Always use the supplied parts to attach the solar modules and mounts. Use of weaker parts, such as screws that are too short, is dangerous and may cause the solar modules or mounts to fall.
- Always use the specified tools.

The solar modules or mounts may fall if the installation is not strong enough, for example when parts are not tightened sufficiently.

- Regardless of whether you are working on a new or existing roof, never allow the sheathing to become wet. Protect the sheathing from rain during the installation. Failure to do so may cause leaks.
- Always use the specified materials.

Use of other materials is dangerous. Materials other than specified can reduce performance and can cause leaks, shock, and so on.

- Do not modify or cut parts.
- Do not install system in a location within 0.3 miles from the ocean or any salt water.
- Do not install in corrosive locations classified C5 by ISO.
- Protective earth grounding of the individual photovoltaic modules is achieved by the secure of the modules to the mounting frames. The assembly instructions should be closely followed, in order to ensure a reliable ground connection.
- The framing system has only been evaluated by TUV for use with the photovoltaic modules listed in this manual.



1.1 CAUTIONS REGARDING INSTALLATION OF SOLAR POWER SYSTEMS

This manual contains critical information regarding electrical and mechanical installation and safety information which you should know before starting installation.

The information in this manual is based on CHINALIGHT's knowledge and experience, however, the information and suggestions do not constitute a warranty.

CHINALIGHT reserves the right to make changes to the product, specifications, or manual without prior notice.

Do not locate systems near coastal locations or other salt water locations or C5 locations as classified by ISO. Minimum distance is 0.3 miles from the body of water. Do not locate in a corrosion prone area. The modules and system are TUV listed to standard IEC61215. The TUV IEC61215 test is performed at 1.5 times the design load of 30 lbs per square foot, or 45 lbs per square foot. The system has been load tested by CHINALIGHT to 50 PSF. Building departments often require a design safety factor of 1.5 or greater for structures. The maximum structural loading listed in this guide, does not include an added safety factor. Check with your local building department for code information.

Caution :

- 1** Do not drill holes in frame. Do not cut or modify parts or rails.
- 2** Work under dry conditions with dry tools.
- 3** Do not stand or step on solar module.
- 4** Do not install near flammable gases.
- 5** Do not drop or allow objects to fall onto module.
- 6** Completely cover solar module with opaque materials when wiring to halt production of electricity.
- 7** Keep the back side of solar module surfaces free of foreign objects.
- 8** Do not use chemicals on solar modules when cleaning.
- 9** Do not wear metallic jewelry, which may cause electrical shock.
- 10** Do not touch cable electrical contacts.
- 11** Do not expose solar modules to sunlight that is concentrated with mirrors, lenses or similar means.
- 12** Consult local codes and other applicable laws and statutes concerning required permits and regulations concerning installation and inspection requirements. Install



solar modules and systems according to applicable codes.

13 Product should be installed and maintained by qualified personnel. Keep unauthorized personnel away from solar modules.

14 Avoid shadowing cells in order to prevent solar module hot spots and/or reduction in power.

15 Avoid installing modules and mounting system in high corrosion areas.

1.2 MOUNTING SYSTEM

Solar modules are installed on rooftops where there is danger of personnel falling off of the roof. Scaffolding, stepladders, and ladders may be dangerous and require caution. The installation of solar modules involves work in high places, take extreme precautions to avoid falling from roof. To prevent accidents, safety regulations must be observed. Always take the following precautions to prevent accidents and injury.

1 Take the following precautions before starting work.

- Plan the job and visit the site before starting work.
- On site, do not work alone. Always work with at least one other person.
- Inspect power tools before using them.

2 When conditions make it necessary, tell workers to stop working.

- When it is raining, or there is a strong probability that it will start raining.
- Immediately after rain, and when work areas are slippery.
- When high wind conditions exist, or are expected, or when a high wind warning has been issued.
- When it is snowing, or when there is snow underfoot.
- When the condition of the scaffolding and ladders are not satisfactory.

3 Wear appropriate work clothes and protective equipment.

- Work clothes for both the upper and lower body should fit well and allow you to move freely.
- Always wear protective equipment such as harnesses and lifelines.
- Wear a helmet and secure it correctly.
- Wear non-slip shoes. Shoes get dirty when worn on a roof, so keep the soles clean.

4 Observe safety regulations for ascending and descending ladders and stepladders.

- Before use, always inspect ladders and stepladders to make sure they are in good condition.
- Choose a safe spot to anchor ladders and stepladders.
- Always work with a partner. One person should hold the ladder steady.
- Ladders from a first-story roof to a second-story roof are very dangerous. Do not set up a ladder on a roof. When there is no other choice, straddle the ridge and lay down a rubber anchor mat, and secure the ladder to the mat. Always have one person hold the ladder firmly.
- When you use a two-stage ladder, secure it with ropes or stays to prevent it from sliding sideways, and have two persons hold the ladder steady.



- Use ladders with steps broad enough to permit safe work.

5 When working in high places, wear harnesses and use scaffolding.

- When working at heights of 6 ft or more, use scaffolds or other equipment to ensure a stable work platform.
- Scaffolds should be designed and erected by a qualified person.
- When it is difficult to erect a stable work platform, install safety nets, wear harnesses, and take other measures to prevent falls.
- Regulations mandate the use of harnesses. Fasten harnesses securely, and check that the length of lifelines is 6 ft or less.
- Attach the primary support line securely to a metal fixture installed for that purpose on a ridge or beam.

6 Install enclosures and covers.

- Install enclosures, guardrails, or covers at the end of work decks that are 10 ft or more above ground, at openings, and at other dangerous locations.
- When it is extremely difficult to install enclosures, guardrails, or covers, or when they must be removed to work in that location, install a safety net, wear harnesses, and take other measures to prevent falls.

7 Protect against falling objects.

- When objects are thrown down from a height of 6 ft or more, appoint a surveillance person on the ground and warn others about falling objects.
- Do not allow third parties to enter the work area during construction.
- Arrange tools and materials neatly and secure them with ropes, or use bags or other measures to prevent falling objects.

8 Other

- When there are electric power lines near the roof or eaves, request the power utility to take advance measures to prevent shock.
- Check the health of workers before starting work.
- Lift packaged modules by grasping both sides of the package. Do not lift by grasping the band, as the band can break.
- Never step or sit on the glass surface of a solar module.

1.3 PV MODULES

Warning

Wiring work should be performed according to the provisions of the National Electrical Code(NEC). Grounding work and wiring connections to the inverter should be performed by a qualified electrician.

The solar array generates electricity whenever it is exposed to sunlight. Be careful when handling it. There is a danger of shock if you touch the connectors or wires of the electric cables.

1 Points to check before wiring.



- The solar modules generate electricity when exposed to light. You will need to wear insulating gloves.
- You will need a multi-meter for volts, amps, resistance and continuity capable of measuring DC and AC up to 600V and 40A.
- Make sure your tools are insulated.

2 Wiring the solar modules.

- Never step or sit on the glass surface of the solar modules. The glass may break.
- When you install the solar modules on the mount, never allow an output cable to become caught between the mount and a module frame.
- The solar modules generate electricity when exposed to sunlight, take care not to short circuit the output cables. The cables can become overheated and their cable sheaths can melt.
- Ensure the module connectors are fully inserted. There is a risk of malfunction if they are not pushed in all the way.
- Support output cables so that there is no slack. High winds can blow slack cable against the mount, damaging the cables.

3 Wiring from solar arrays to the inverter (connector box).

- Follow the provisions of the National Electrical Code.
- For wiring through walls, protect the cables with metal conduits, flexible metal conduits, or other protection. Failure to do so can result in shock and short circuits. Always use conduit to protect sections of array output cables that are exposed to sunlight. For wiring outdoors, protect cables with PVC conduits, metal conduits or flexible conduits.
- Prevent water from entering or building up in conduit by using waterproof fittings or duct seal.
- To prevent shock, tape and label the cut ends of array output extension cables (the side opposite to the connector side) before connecting to solar module output cables. Further, tape them again after measuring the voltage of each array.
- To prevent shock when you connect the array output cables to the inverter, remove the tape one cable at a time as you connect the cables.

4 Measuring array output voltage

- See the description of how to measure the output voltage for each array.
- Make sure that all solar modules are exposed to sunlight. (Remove lightproof sheets, if present.)
- Set the volt meter measurement range to a DC voltage, greater than the expected measurement (for example 600 VDC).
- Keep the plus (+) solar array output cables away from the ends of the minus (-) cables. Dangerous arcs can occur. (The array output voltage under normal conditions (clear skies) can be very high.)

5 Grounding the mount

- To prevent shock, always connect a ground wire from the mounting hardware to earth.
- Use a minimum #10 AWG ground wire. Run a continuous bond wire to each



module and rail in the array. Refer to section on grounding in this manual.

- Follow NEC 690 grounding provisions.

2 POINTS TO CHECK WHEN SELECTING THE INSTALLATION LOCATION

Check the following items before starting installation work.
Refer to the inverter installation manual for more information about inverter installation and electrical work.

2.1 CONDITION OF HOUSE WHERE SOLAR POWER SYSTEM IS TO BE INSTALLED

INSPECTION OF ROOF STRUCTURE

It is important to inspect the structural integrity of the roof and the durability of the roof materials. The mounting structure and solar modules require a strong base for durable and reliable operation in local environments. Always wear a safety harness when working on the roof. Inspect the roof surface in the area of the installation for cracks, water leakage, and roofing material quality and uniformity. This is especially important if the roof is older than 10 years. Inspect the roof for sags and other abnormalities. A sag or deep depression in the roof may indicate a structural weakness in the support system that may require correction. The following illustrations detail typical roof construction as well as old roof problems.

INSPECTION OF THE ROOF SUPPORT SYSTEM

This may require access to the attic. Check that all rafters, trusses and other materials are in good condition. Check for indication of previous water leaks. Measure the spacing of the rafters or trusses to confirm the dimensions and prepare for the system layout. Determine the location of the electrical roof penetration and wire run, if wiring is planned for this area.

3 SPECIFICATIONS

3.1 SOLAR MODULE AND ARRAY SPECIFICATIONS MODULES:

CLS-230P

1 Array specifications (typical examples)

Array: Layout of series connected solar modules

Solar module	CLS-230P			
Solar modules	18	20	24	27
Solar power capacity (kW) STC	4.1	4.6	5.5	6.2
Solar module area (m ²)	29.4	32.7	39.2	44.1

2 Individual specifications and dimensions

Module model name	CLS-230P
Maximum power (P_{max})	230W
Voltage at P_{max} (V_{mp})	29.28V
Current at P_{max} (I_{mp})	7.86A
Open-circuit voltage (V_{oc})	37.38V
Short-circuit current (I_{sc})	8.31A
Weight	20KG
Dimension	1650mm*990mm*50mm

Rated electrical characteristics are within ± 10 percent of the indicated values of I_{sc} and V_{oc} and within $+10/-5$ percent of P_{max} under standard test conditions (irradiance of 100 mW/cm², AM 1.5 spectrum, and a cell temperature of 25°C (77°F)). Under normal conditions, a photovoltaic module may experience conditions that



produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, the values of I_{sc} and V_{oc} marked on TUV Listed modules should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output.

4 PARTS

STANDARD PARTS

Part No.	1	2	3	4	5	6
Name	Dock washer	M8 Bolt 20	Module mounting clip	Threaded tab	M4 Sidecover screw	Rail

OPTIONAL PARTS

Part No.	1	2	3	4	5
Name	Cable support bar	Cable clip	Silicone caulking	Threaded tab	M8 Bolt 30

5 POINTS TO CHECK BEFORE INSTALLATION WORK

WARNING

- The solar modules generate electricity when exposed to sunlight, so be careful not to short circuit the output cables. The cables can become overheated and their cable sheaths can melt.
- Stop working when the surface of the roof is wet. There is a danger of slipping, falling, and shock.

CAUTION

- Never step or sit on the glass surface of the solar modules. The glass may break.
- Do not twist the solar modules when you mount them (twisting should not exceed 0.1" per 4"). Failures and damage can result.
- When you mount the solar modules on the rail, never allow an output cable to become caught between the rail and a module frame. Short circuits and fire can result.

5.1 UNPACKING AND CHECKING PARTS

When you unpack the system, check the model names of the components of each system and check to be sure that you have the correct number of parts.

5.2 MATERIALS AND TOOLS YOU WILL NEED

Before starting installation work, make sure you have the following materials and tools on hand (including materials and tools for electrical work).

Materials						
tools	Ground wire	Ground rod	Electrical tape	metal conduit (to protect electric cables)	Cable ties	Pencil
	Cordless drill	Socket drivers 8 mm & 13 mm	Phillips driver bits	Drill	Screw driver set	
	Needle nose pliers	Line man's pliers	Wire cutters	Hammer	Chisel	
	Crimping tool	Knife	Tape measure	Extension cord	Chalk line	



	Gloves & safety helmet	Rope	Tool belt	Ladders	Safety Harness	
	Safety glasses	Air mask	Ratchet Wrench			
Measurement	Compass	Calculator	Solar insolation meter	Digital multimeter		

6.INSTALLATION WORK

6.1 PREPARING SHINGLE ROOF FOR INSTALLATION

1. Locate roof rafters or trusses.

Tip: here are 3 options to finding the locations.

A. Locate and measure the locations of the rafters in the attic or at the outside eave and transfer measurements to the roof.

B. Use a rubber or leather mallet to tap the roof and locate the rafters. This will work with a cap sheet or composition roof.

C. Scan the roof with a high sensitivity stud finder.

2. Once the rafters have been located, snap a chalk line on every rafter to identify the location.

3. Measure up from the eave 400 mm in at least 3 locations. Snap a chalk line. This marks the location of the bottom edge of the slider feet.

Note: This line needs to be 5.5 mm away from the nearest front edge of shingles.

4. Measure up from chalk line 20 mm and snap a new chalk line. This marks the location of the bottom edges of the modules.

5. Measure up from the module chalk line to the desired module length to form the array. Snap horizontal lines at the measured locations.

6. Mark and layout solar module vertical lines.

Note: modules should not fall in shaded areas.

6.2 CHECKING LAYOUT

1. Before installing sliders, check layout of rails and splices.

2. Place all sliders in desired locations.

3. Pre-assemble rails and splices.

4. Place rails with splices into position. Ensure slider locations do not overlap splices.

5. If these overlap or seem too close, shift rails horizontally or move sliders to next rafter or remove splices to switch the long and short rails to opposite sides. Reattach splices after rails are switched and recheck for overlap.

6.3 INSTALLING THE FLASHINGS (OPTIONAL)

Flashings can improve water and ice management on the roof by directing the water around the rail slider assembly. It is ideal for use in new construction, reroof, and in locations with significant precipitation. The flashings are installed below the standard slider assembly. Each flashing is similar in size to the slider assembly. The flashing has a large flange around its perimeter to allow for integration with the surrounding shingles. There are 3 alignment marks on the flashing and identification for the orientation of the part.

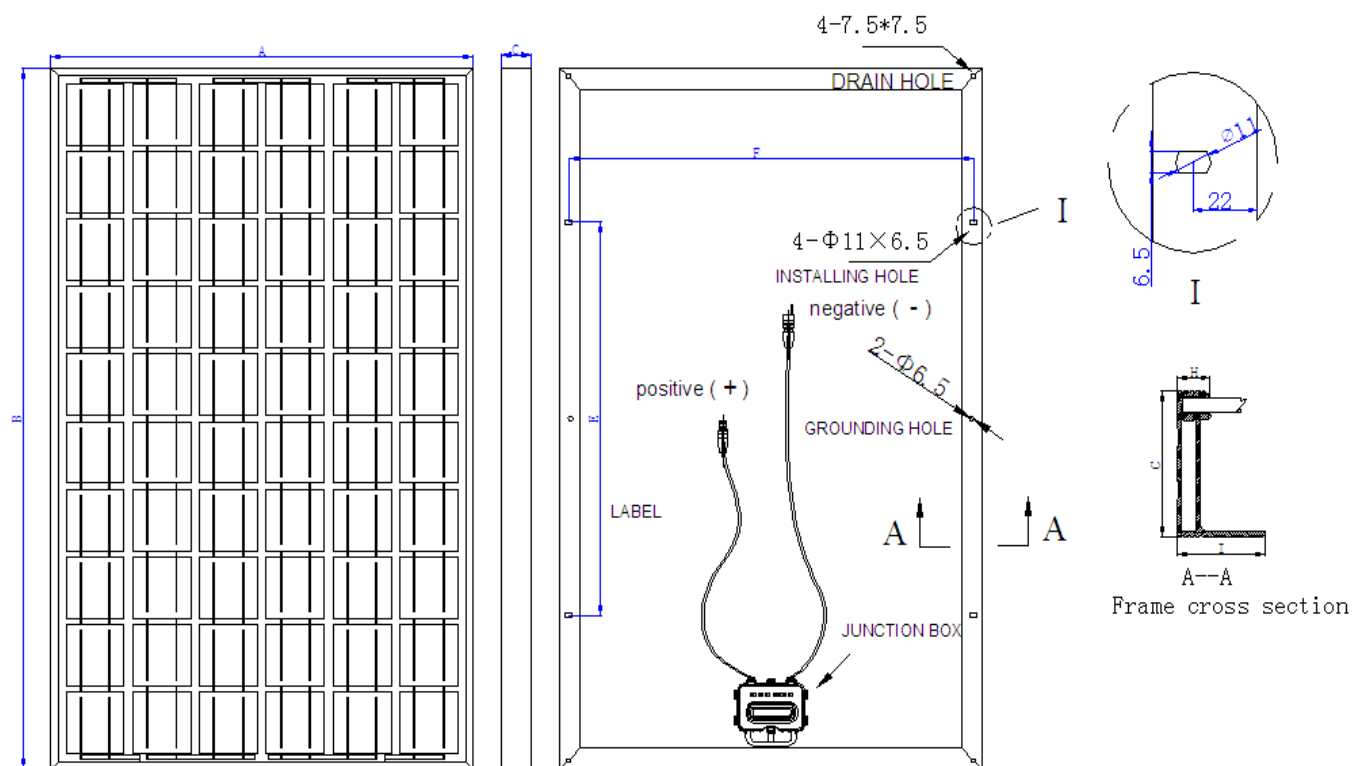
1. Confirm the locations of each standard slider assembly. Follow the same rules for installation as the slider foot. The flashings located on the bottom rail (close to the eave), should be aligned with the chalk lines created in the roof layout. Flashings used to support the center rails, should be centered on the rail line. The flashings located at the top rail (close to the ridge), should have minimal exposure beyond the rail.
2. Dry fit the flashing in the location marked for installation. Use a utility knife to cut the surrounding shingles to assure a flush and water resistant fit. Install flashing over a layer of shingles to insure water resistance.
The arrow on the flashing should point to the eave side. Install flashing over a layer of shingles to insure water resistance.
3. Invert the flashing, peel off the protective backing paper and apply a bead of roofing silicone along the top and sides in the flange area. Leave the bottom flange clear for water drainage. Make sure that the shingles are at room temperature, ~68°F. When shingles are cold, they become brittle and are difficult to work with. Use a putty knife to lift the shingles and slide in the flashing.
4. Apply a bead of silicone on the top and sides of the flange that contact the surrounding shingles. Press the area to create tight seal.
5. Peel off the backing paper from the standard slider. Place the standard slider assembly on the flashing and secure with the supplied flashing screws 110 mm.

6.4 Mechanical Installation

ChinaLight Solar modules can be mounted using the following methods:

(Note: All installation methods herein are only for reference, and ChinaLight solar will not provide related BOS components, the system installer or trained professional personnel must be responsible for the PV system's design, installation, and mechanical load calculation and security of the system.)

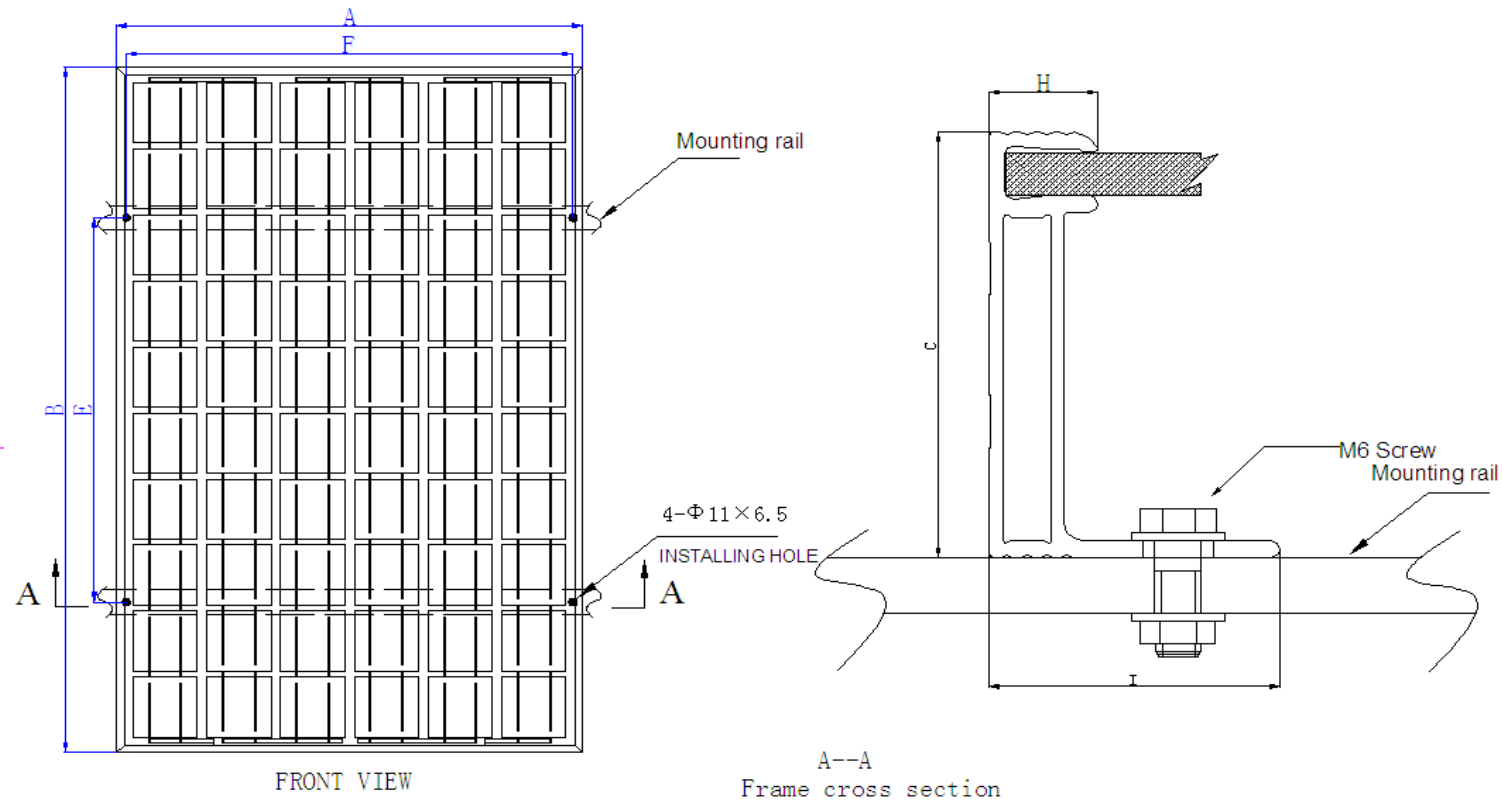
- Using corrosion-proof screws (M6) in the existing installing holes in the module frame.
- Using suitable module clamps on the long side of the module frame to mount the modules ("portrait orientation")
- Using suitable module clamps on the short side of the module frame to mount the modules ("landscape orientation")



FRONT VIEW

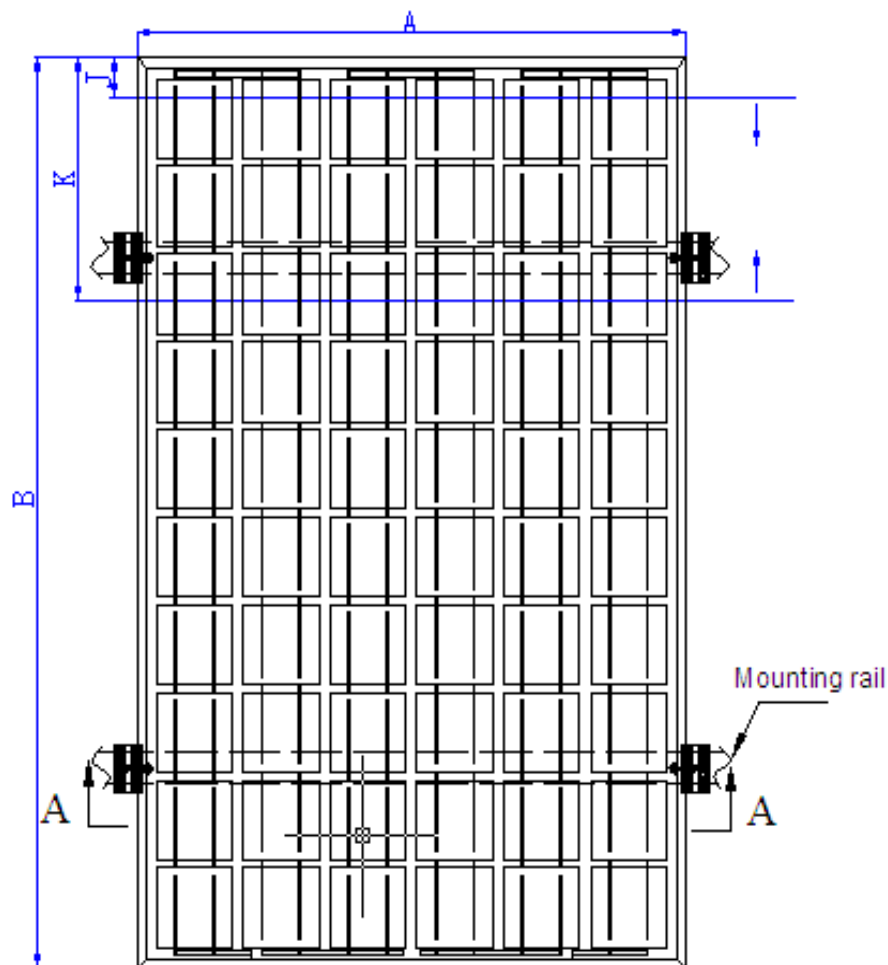
BACK VIEW

module type	Cell type	Cell quantity	module dimension A*B*C(mm)	Install hole dimension E*F(mm)	Cable Length (mm)	Profile cross-section size H*C*I(mm)
CLS-170P	Multi	6*8	1335*990*50	1055*6.5	1000	12*50*32
CLS-190P	Multi	6*9	1494*996*50	1214*6.5		12*50*32
CLS-230P	Multi	6*10	1650*990*50	1020*6.5		12*50*32
CLS-270P	Multi	6*12	1968*996*50	1688*6.5		12*50*32
CLS-170M	Mono	6*12	1580*808*50	1300*6.5		12*50*35

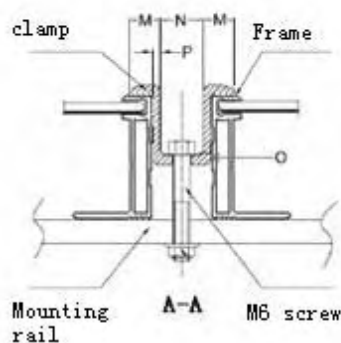
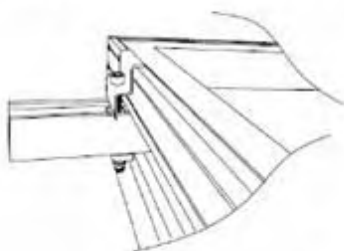


module type	Cell type	Cell quantity	module dimension A*B*C(mm)	Install hole dimension E*F(mm)	Cable Length (mm)	Profile cross-section size H*C*I(mm)
CLS-170P	Multi	6*8	1335*990*50	1055*6.5	1000	12*50*32
CLS-190P	Multi	6*9	1494*996*50	1214*6.5		12*50*32
CLS-230P	Multi	6*10	1650*990*50	1020*6.5		12*50*32
CLS-270P	Multi	6*12	1968*996*50	1688*6.5		12*50*32
CLS-170M	Mono	6*12	1580*808*50	1300*6.5		12*50*35

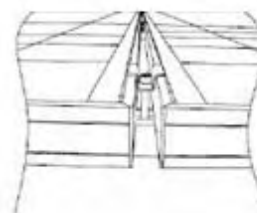
Clamp fitting (portrait orientation): Use a certain number of clamps to fix the modules on the mounting rail. The module clamps should not come into contact with the front glass and must not deform the frame. Be sure to avoid shadowing effects from the module clamps. The module frame is not to be modified under any circumstances. When choosing this type of clamp-mounting method, please be sure to use at least four clamps on each module, two clamps should be attached on the long sides of the module. Depending on the local wind and snow loads, additional clamps may be required to ensure the module can bear the load. The applied torque should be about 8 Newton-meters. Please find detailed mounting information in the below illustration



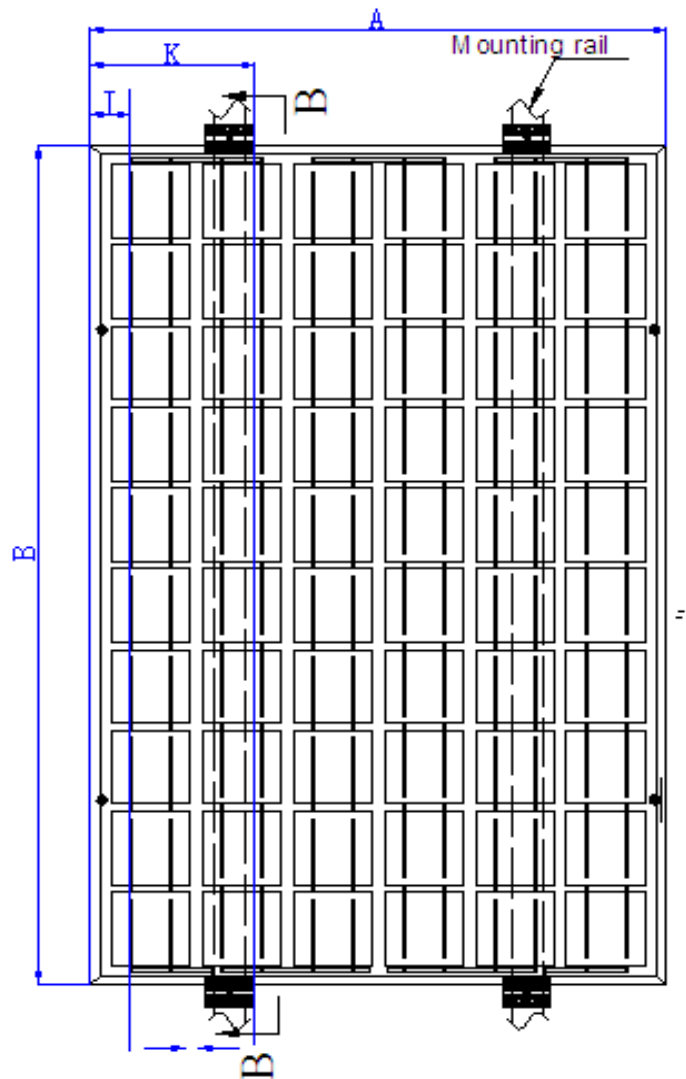
Fringe modules installation



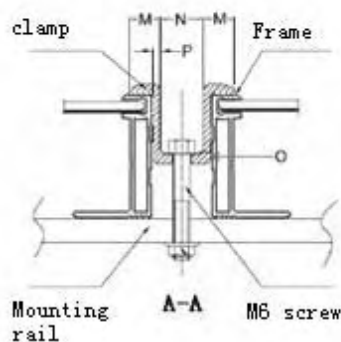
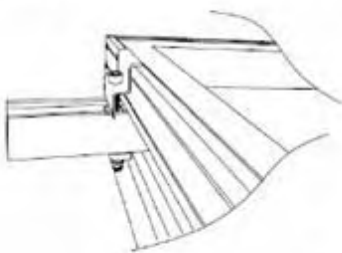
Middle module installation



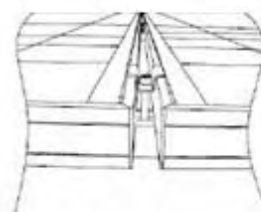
Clamp fitting (landscape orientation): Use a certain number of clamps to fix the modules on the mounting rail. The module clamps should not come into contact with the front glass and must not deform the frame. Be sure to avoid shadowing effects from the module clamps. The module frame is not to be modified under any circumstances. When choosing this type of clamp-mounting method, please be sure to use at least four clamps on each module, two clamps should be attached on the short sides of the module. Depending on the local wind and snow loads, additional clamps may be required to ensure the module can bear the load. The applied torque should be about 8 Newton-meters. Please find detailed mounting information in the below illustration:



Fringe modules installation



Middle module installation



6.5 SYSTEM GROUNDING

Upon completion of the array ground wire, bring to the rooftop junction box. Use at least a 10 AWG ground wire for this purpose. The ground will continue down to the DC disconnect and to the inverter. The inverter must be grounded to a ground rod. All of the Rails in an installation shall be provided with protective earth grounding wires when installed.

Accomplishing a code compliant grounding system is critical to the safety of the system. Continuous grounding of all modules and mounting system components is required.

1. Install outdoor rated ground lugs or ring terminals with ground wire .Use the marked ground hole on either end of the rail.
2. Connect a minimum # 10 AWG solid conductor, copper, ground wire to the ground lug or ring terminal.
3. Land the end of the ground wire in the array junction box.
4. Run the ground wire to the DC disconnect and inverter.
5. Run the ground wire from the inverter to a ground rod.

6.6 INSTALLING MODULE SUPPORT RAILS

1. Create appropriate rail length by incorporating rail splice kit. Place splice under rails to be joined and fasten using 4 M8 bolts. Hand tighten 5 turns and use a 13 mm socket wrench to tighten to appropriate torque.
2. Place rail on standard slider top bracket.
3. Insert M8 bolts through AD804 dock washer and fasten to standard slider bottom bracket.
4. Use shim kit to level the height of the rail on the roof. Place shim between rail and standard slider top bracket. Slide the shim into the bolt so that it is fully engaged.

7. LIMITED WARRANTY

1. Limited Product Warranty—ten-year Repair, Replacement or Refund Remedy

Chinalight Solar Co., Ltd. (“Chinalight Solar”) warrants its Photovoltaic PV-modules to be free from failure due to the materials and manufacturing of the PV-modules under properly installation and normal operation conditions. Chinalight Solar at its option will make repairs, replacement or compensation of them based on the purchasing prices within 10 years starting from the date that PV-modules are sold to initial customer. The options of repairs, replacement and compensation or refundment shall be the sole and exclusive. This limited Product Warranty does not warrant specific output power, which shall be exclusively listed under clause 2 hereinafter (Limited Peak Power Warranty).

2. Limited Warranty of Peak Output Power

A: The Phase 1 of Warranty—10 years

Within 10 years starting from the date that PV-modules are sold to the customer, if the output power of any Photovoltaic PV-module is less than 90% of minimum peak power listed in the data sheet provided by Chinalight Solar at the date of PV-module shipment due to some failure of the materials and manufacturing technology, and it will have been confirmed, Chinalight Solar should make remedy for these losses, covering the repair replacement of mal-functional PV-modules or refundment of the payments that are originally paid by the customers, at an annual depreciation 10% of the purchasing price.

B: The Phase 2 of Warranty - 25 years

Within 25 years starting from the date that PV-modules are sold to the customer, if the output power of any Photovoltaic PV-module is less than 80% of minimum peak power listed in the data sheet provided by Chinalight Solar at the date of PV-module shipment due to some failure of the materials and manufacturing technology, and it will have been confirmed, Chinalight Solar should make remedy for these losses, covering the repair replacement of mal-functional PV-modules or refundment of the payments that are originally paid by the customers, at an annual depreciation 4% of the purchasing price.

The remedies set forth in this clause 2 shall be the sole and exclusive under the limited Peak Power Warranty.

3. Limitations and Exclusions of the Warranty

A: In any cases, customers’ claims must be in the period of the limited Warranty.

B: The limited Warranty does not apply to the cases in the following, which will be solely adjudged by Chinalight Solar

- * Misuse, abuse , neglect or accident;
- * Improper installation and operations or mis-replacement;
- * Not following the Chinalight Solar's installation manual and maintenance instructions;
- * Any repairs or replacements carried out by the technicians that are un-authorized by Chinalight Solar;
- * Power failure surges, lightning, flood, fire, accidental breakage or other events beyond the PV-module quality control of Chinalight Solar.

C: The limited warranties do not cover any transportation costs for the return of Mal-function PV-modules from customers, and the costs involved in the removal of the defective PV-modules or re-installation of repaired or new PV-modules.

D: Warranty claims will not be accepted if the type or serial number of the PV-modules have been changed, removed or made illegible.

4. Warranty Fulfillment

If the customer considers that his/her claim is justified according to the limited Warranty, he/she must immediately notify: (a) dealers who sold the PV-modules; (b) any distributors authorized by Chinalight Solar; (c) directly send such notification to the Chinalight Solar. Together with the notification the customer should enclose evidences of the purchase of the PV-modules. If applicable, customer's dealers or distributors should be responsible for giving advice to end-customers on handling their claims. If necessary, customer should make a written description for Chinalight Solar. The return of any defective PV-modules will not be accepted unless the customer has been given a written document by Chinalight Solar.

5. Severability

If any parts, provisions or clauses of the limited Warranty, or the application thereof to any person or circumstance, are held invalid, void or un-enforceable, such provisions or clauses shall not impair the validity or enforceability of the other part, provisions, clauses or applications of this limited Warranty shall be treated as severable.

6. Disputes

No action, regardless of form, arising out of any causes, or in any way connected with the limited Warranty, may be brought by Customer more than one(1)year after the cause of action has accrued.

7. Variety

The repair or replacement of the PV-modules or the supply of additional PV-modules neither cause the start of new Warranty terms, nor should the original terms of the limited warranty be extended. Any replaced PV-modules will be of the property of Chinalight Solar. It has the right to deliver another type (different in size, colour, shape and/or power) of modules in case Chinalight Solar stopped producing the PV-module in question at the time of the claim.

8. Force Majeure

Chinalight Solar shall not be liable to the customer or any third-party in the event that Chinalight Solar is prevented from fulfilling or delays to fulfilling its sale terms and conditions (including this limited Warranty) hereunder force majeure. Force majeure shall mean Acts of GOD, war, riots, strikes, unavailability of suitable and sufficient labour, material, die, or capacity or technical or yield failures and any unforeseen event beyond the control of Chinalight Solar, including, without limitations, any technological or physical event or condition which is not reasonably known or understood at the time of the sale of the PV-modules or the claim.

Note:

“Peak Power” is the power generated by a PV-module when it is working at its maximum power point. The Chinalight Solar’s standard test conditions of PV-modules are in accordance with IEC61215, which are: (a) illumination spectrum of AM1.5; (b) irradiation of 1,000W/m²; (c) the cell temperature of 25°C. The tests are carried out through the two terminals of junction box on the PV-modules.